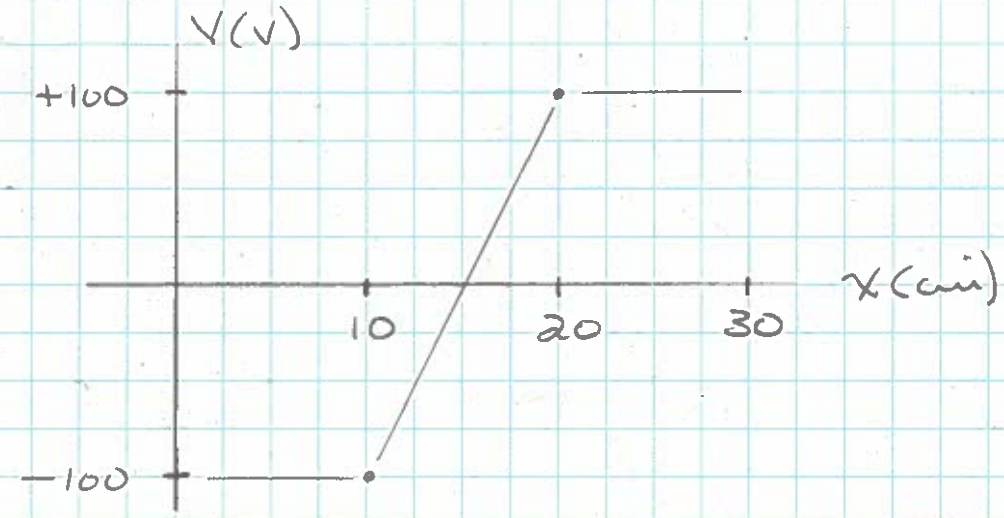


$$E_x = -\frac{\partial V}{\partial x} = -\frac{dV}{dx} = -(\text{slope of } V \text{ vs. } x)$$

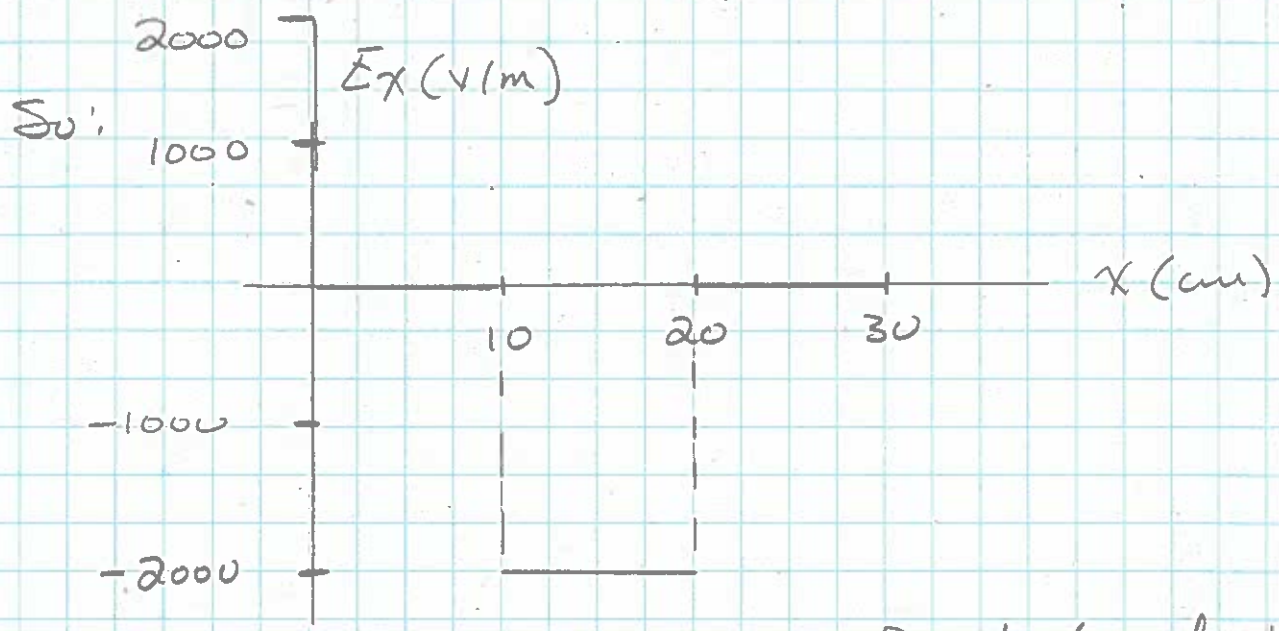
For $x = 0 \to 10\,cm$: $E_x = 0$

For $x = 10 \to 20\,cm$: $E_x = -\left(\frac{100-(-100)}{.2m-.1m}\right) = -2000\,\frac{V}{m}$

For $x = 20 \to 30\,cm$ $E_x = 0$

For $x = 20 \to 30\,cm$: $E_x = 0$

So:



Don't forget the negative sign in

$$E_x = -\frac{\partial V}{\partial x}$$